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Maine Geological Survey

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For additional information,
see Open-File Report 99-124.

Surficial Geology

SOURCES OF INFORMATION

Surficial geologic mapping by Cheryl L. Marvinney completed during the 1992 and 1993 field seasons; funding for this work provided by the U.S. Geological Survey COGICOMAP program. Geologic unit designations and contacts revised and matched to adjacent quadrangles in 1999 by MGS geologists.

SCALE 1:24,000

0 1000 2000 3000 4000 5000 6000 7000 FEET

0 1 KILOMETER












CONTOUR INTERVAL 10 FEET

TRUE NORTH

Topographic base from U.S. Geological Survey North Powell quadrangle, scale 1:24,000 using standard U.S. Geological Survey topographic map symbols.

The use of industry, firm, or local government names on this map is for location purposes only and does not implicate responsibility for any present or potential effects on the natural resources.

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|------|---|
| Ha | Stream alluvium - Sand, silt, and minor amounts of gravel deposited on flood plains of modern streams. |
| Hw | Freshwater wetlands - Muck, peat, silt, and sand. Poorly drained areas, often with standing water. |
| Qe | Eolian deposits - Well-sorted fine sand deposited by wind. |
| Pmn | Marine nearshore deposits - Pleistocene silt to gravely sand deposited as a result of wave activity in nearshore or shallow-marine environments; not associated with beach morphology. |
| Pms | Marine shoreline deposits - Predominantly sand and gravel. Consists of beach deposits formed during regressive phase of marine submergence. |
| Pp | Presumpscot Formation - Massive to laminated silt clays, which overlie bedrock and till and locally are interbedded with and overlie end moraines and marine fan deposits. Includes sand deposited as a distal unit of submarine fans. Unit contains fossil shells in few exposures. |
| Pem | End moraines - Linear ridges with exposures indicating stratified sand and gravel, locally interbedded with Presumpscot Formation silt clays sand/or till. Pembg - Gerrish Brook end moraine Pempc - Pownal Center end moraine End moraines based on morphology, surface augering and/or limited exposure: Pempw - West Pownal end moraine Pemfr - Fickett Road end moraine |
| Pemc | End moraine complexes - Clusters of smaller, steep-sided linear ridges consisting of dense sand-matrix diamiction. Pemc _{1,2} - Runaround Pond moraine clusters 1 and 2. Pemcs - Stackpole Pond moraine complex. |
| Pmf | Submarine outwash fans - Thick sand and gravel accumulations formed at the mouths of subglacial tunnels located at Pleistocene ice margins. The sand and gravel is interbedded with and overlain by Presumpscot Formation clays at the distal edges of the fans. Each fan, or group of fans, has been assigned a unique geographic name, listed below: Pmf _{bl-1,3} - Blackstone fans Pmfcr - Cushing Road fan Pmfvd _{1,3} - West Durham fans Pmfri _{1,3} - Rabbit Run fans |

| | |
|---|---|
|  | Esker - Gravel and sand deposited in an ice tunnel by a subglacial meltwater stream. Chevrons point in the direction of meltwater flow. |
|  | Till - Gravely to bouldery, sandy-matrix diamicton. |
|  | Thin till deposits - Areas where till is generally less than 10 ft thick and bedrock outcrops may be common. |
|  | Thin drift areas, undifferentiated - Areas with less than ten feet of drift covering bedrock. Till overlies bedrock on hillslopes and ridge crests; Presumpscot Formation silty clays are present in depressions; and nearshore deposits locally overlie till. Presumpscot Formation, and bedrock on hillslopes and at the base of these slopes. |
|  | Bedrock exposure - Small rock outcrops, and areas of numerous small outcrops are shown as gray areas. |
|  | Striation - Glacial striation locality. Dot marks point of observation. Number indicates azimuth of ice-flow direction. |
|  | Drumlin - Glacially streamlined hill. |
|  | End moraine - End moraine crests. Dashed where inferred. |
|  | Scarps - Scarp resulting from stream erosion. Hachures on downslope side. |
|  | Ice marginal position - Mapped and inferred ice marginal positions. |
|  | Marine fossil locality - Site where fossil shells have been collected and dated (Weddle, T. K. and Retelle, M. J., 1995; see Marvinney, 1999). Label indicates radiocarbon age estimate. |

A surficial geology map shows all the loose materials such as till (commonly called hardpan), sand and gravel, or clay, which overlie solid ledge (bedrock). Bedrock outcrops and areas of abundant bedrock outcrops are shown on the map, but varieties of the bedrock are not distinguished (refer to bedrock geology map). Most of the surficial materials are deposits formed by glacial and deglacial processes during the last stage of continental glaciation, which began about 25,000 years ago. The remainder of the surficial deposits are the result of erosion, deposition, and sedimentation of floodplains, or are attributed to human activity, such as fill or other land-modifying features.

The map shows the actual distribution of the different types of glacial features, deposits, and landforms as described in the map explanation. Features such as striations and moraines can be used to reconstruct the movement and position of the glacier and its margin, especially as the ice sheet melted. Other ancient features include shorelines and deposits of the glacial meltwater. The map is useful in conjunction with related maps such as the quadrangle is useful to the larger understanding of past earth climate, and how our region of the world underwent recent geologically significant climatic and environmental changes. We may then be able to use this knowledge in anticipation of future similar changes for long-term planning efforts, such as coastal development or waste disposal.

Surficial maps are also useful in conjunction with related maps such as the surficial materials maps for significant sand and gravel aquifer maps for anyone wanting to know what lies beneath the land surface. For example, these maps may aid in the search for water supplies, or economically important deposits such as sand and gravel for aggregate or clay for bricks or pottery. Environmental issues such as the location of a suitable landfill site or the possible spread of contaminants are directly related to a surficial geology map. The surficial geology map is also useful in conjunction with maps of siting of homes may be better planned with a good knowledge of the surficial geology of the site. Refer to the list of related publications below.

1. Marvinney, C. L., 1999, Surficial geology of the North Pownal 7.5-minute quadrangle, Androscoggin and Cumberland Counties, Maine: Maine Geological Survey, Open-File Report 99-124, 7 p.
2. Marvinney, C. L., 1999, Surficial materials of the North Pownal quadrangle, Maine: Maine Geological Survey, Open-File Map 99-62.
3. Neil, C. D., 1999, Significant sand and gravel aquifers of the North Pownal quadrangle, Maine: Maine Geological Survey, Open-File Map 99-25.
4. Thompson, W. B., 1979, Surficial geology handbook for coastal Maine: Maine Geological Survey, 68 p. (out of print)
5. Thompson, W. B., and Borns, H. W., Jr., 1985, Surficial geologic map of Maine: Maine Geological Survey, scale 1:500,000.
6. Weddle, T. K., and Retelle, M. J., 1995, Glaciomarine deposits of the late Wisconsinan Casco Bay Sublobe of the Laurentide Ice Sheet, *in* Huxsey, A. M., II, and Johnston, R. A. (editors), Guidebook to field trips in southern Maine and adjacent New Hampshire: New England Intercollegiate Geological Conference, 87th annual meeting, Brunswick, Maine: p. 175-194.